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ATGGGTGCGAGAGCGTCAGTATTAAGCGGGGGAGAATTAGATCGATGGGAAAAAT

TCGGTTAAGGCCAGGGGGAAAGAAGAAGTACAAGCTAAAGCACATCGTATGGGCAA

GCAGGGAGCTAGAACGATTCGCAGTTAATCCTGGCCTGTTAGAAACATCAGAAGGC

TGTAGACAAATACTGGGACAGCTACAACCATCCCTTCAGACAGGATCAGAGGAGCT

TCGATCACTATACAACACAGTAGCAACCCTCTATTGTGTGCACCAGCGGATCGAGA

TCAAGGACACCAAGGAAGCTTTAGACAAGATAGAGGAAGAGCAAAACAAGTCCAAG

AAGAAGGCCCAGCAGGCAGCAGCTGACACAGGACACAGCAATCAGGTCAGCCAAAA

TTACCCTATAGTGCAGAACATCCAGGGGCAAATGGTACATCAGGCCATATCACCTA

GAACTTTAAATGCATGGGTAAAAGTAGTAGAAGAGAAGGCTTTCAGCCCAGAAGTG

ATACCCATGTTTTCAGCATTATCAGAAGGAGCCACCCCACAGGACCTGAACACGAT

GTTGAACACCGTGGGGGGACATCAAGCAGCCATGCAAATGTTAAAAGAGACCATCA

ATGAGGAAGCTGCAGAATGGGATAGAGTGCATCCAGTGCATGCAGGGCCTATTGCA

CCAGGCCAGATGAGAGAACCAAGGGGAAGTGACATAGCAGGAACTACTAGTACCCT

TCAGGAACAAATAGGATGGATGACAAATAATCCACCTATCCCAGTAGGAGAGATCT

ACAAGAGGTGGATAATCCTGGGATTGAACAAGATCGTGAGGATGTATAGCCCTACC

AGCATTCTGGACATAAGACAAGGACCAAAGGAACCCTTTAGAGACTATGTAGACCG

GTTCTATAAAACTCTAAGAGCTGAGCAAGCTTCACAGGAGGTAAAAAATTGGATGA

CAGAAACCTTGTTGGTCCAAAATGCGAACCCAGATTGTAAGACCATCCTGAAGGCT

CTCGGCCCAGCGGCTACACTAGAAGAAATGATGACAGCATGTCAGGGAGTAGGAGG

ACCCGGCCATAAGGCAAGAGTTTTGGCCGAGGCGATGAGCCAGGTGACGAACTCGG

CGACCATAATGATGCAGAGAGGCAACTTCCGGAACCAGCGGAAGATCGTCAAGTGC

TTCAATTGTGGCAAAGAAGGGCACACCGCCAGGAACTGCCGGGCCCCCGGAAGAA

GGGCTGTTGGAAATGTGGAAAGGAAGGACACCAAATGAAAGATTGTACTGAGAGAC

FIG. IA

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AGGCTAATTTTTTAGGGAAGATCTGGCCTTCCTACAAGGGAAGGCCAGGGAATTTT

CTTCAGAGCAGACCAGAGCCAACAGCCCCACCAGAAGAGAGCTTCAGGTCTGGGGT

AGAGACAACAACTCCCCCTCAGAAGCAGGAGCCGATAGACAAGGAACTGTATCCTT

TAACTTCCCTCAGATCACTCTTTGGCAACGACCCCTCGTCACAGTAAGGATCGGGG

GGCAACTCAAGGAAGCGCTGCTCGATACAGGAGCAGATGATACAGTATTAGAAGAA

ATGAGTTTGCCAGGAAGATGGAAACCAAAAATGATAGGGGGGATCGGGGGCTTCAT

CAAGGTGAGGCAGTACGACCAGATACTCATAGAAATCTGTGGACATAAAGCTATAG

GTACAGTATTAGTAGGACCTACACCTGTCAACATAATTGGAAGAAATCTGTTGACC

CAGATCGGCTGCACCTTGAACTTCCCCATCAGCCCTATTGAGACGGTGCCCGTGAA

GTTGAAGCCGGGGATGGACGGCCCCAAGGTCAAGCAATGGCCATTGACGAAAGAGA

AGATCAAGGCCTTAGTCGAAATCTGTACAGAGATGGAGAAGGAAGGGAAGATCAGC

AAGATCGGGCCTGAGAACCCCTACAACACTCCAGTCTTCGCAATCAAGAAGAAGGA

CAGTACCAAGTGGAGAAAGCTGGTGGACTTCAGAGAGCTGAACAAGAGAACTCAGG

ACTTCTGGGAAGTTCAGCTGGGCATCCCACATCCCGCTGGGTTGAAGAAGAAGAAG

TCAGTGACAGTGCTGGATGTGGGTGATGCCTACTTCTCCGTTCCCTTGGACGAGGA

CTTCAGGAAGTACACTGCCTTCACGATACCTAGCATCAACAACGAGACACCAGGCA

TCCGCTACCAGTACAACGTGCTGCCACAGGGATGGAAGGGATCACCAGCCATCTTT

CAAAGCAGCATGACCAAGATCCTGGAGCCCTTCCGCAAGCAAAACCCAGACATCGT

GATCTATCAGTACATGGACGACCTCTACGTAGGAAGTGACCTGGAGATCGGGCAGC

ACAGGACCAAGATCGAGGAGCTGAGACAGCATCTGTTGAGGTGGGGACTGACCACA

CCAGACAAGAAGCACCAGAAGGAACCTCCCTTCCTGTGGATGGGCTACGAACTGCA

TCCTGACAAGTGGACAGTGCAGCCCATCGTGCTGCCTGAGAAGGACAGCTGGACTG

TGAACGACATACAGAAGCTCGTGGGCAAGTTGAACTGGGCAAGCCAGATCTACCCA

GGCATCAAAGTTAGGCAGCTGTGCAAGCTGCTTCGAGGAACCAAGGCACTGACAGA

FIG. IB

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AGTGATCCCACTGACAGAGGAAGCAGAGCTAGAACTGGCAGAGAACCGAGAGATCC

TGAAGGAGCCAGTACATGGAGTGTACTACGACCCAAGCAAGGACCTGATCGCAGAG

ATCCAGAAGCAGGGGCAAGGCCAATGGACCTACCAAATCTACCAGGAGCCCTTCAA

GAACCTGAAGACAGGCAAGTACGCAAGGATGAGGGGTGCCCACACCAACGATGTGA

AGCAGCTGACAGAGGCAGTGCAGAAGATCACCACAGAGAGCATCGTGATCTGGGGC

AAGACTCCCAAGTTCAAGCTGCCCATACAGAAGGAGACATGGGAGACATGGTGGAC

CGAGTACTGGCAAGCCACCTGGATCCCTGAGTGGGAGTTCGTGAACACCCCTCCCT

TGGTGAAACTGTGGTATCAGCTGGAGAAGGAACCCATCGTGGGAGCAGAGACCTTC

TACGTGGATGGGGCAGCCAACAGGGAGACCAAGCTGGGCAAGGCAGGCTACGTGAC

CAACCGAGGACGACAGAAAGTGGTGACCCTGACTGACACCACCAACCAGAAGACTG

AGCTGCAAGCCATCTACCTAGCTCTGCAAGACAGCGGACTGGAAGTGAACATCGTG

ACAGACTCACAGTACGCACTGGGCATCATCCAAGCACAACCAGACCAATCCGAGTC

AGAGCTGGTGAACCAGATCATCGAGCAGCTGATCAAGAAGGAGAAAGTGTACCTGG

CATGGGTACCAGCACACAAAGGAATTGGAGGAAATGAACAAGTAGATAAATTAGTC

AGTGCTGGGATCCGGAAGGTGCTGTTCCTGGACGGGATCGATAAGGCCCAAGATGA

ACATGAGAAGTACCACTCCAACTGGCGCGCTATGGCCAGCGACTTCAACCTGCCAC

CTGTAGTAGCAAAAGAAATAGTAGCCAGCTGTGATAAATGTCAGCTAAAAGGAGAA

GCCATGCATGGACAAGTAGACTGTAGTCCAGGAATATGGCAGCTGGACTGCACGCA

CCTGGAGGGGAAGGTGATCCTGGTAGCAGTTCATGTAGCCAGTGGATATATAGAAG

CAGAAGTTATCCCTGCTGAAACTGGGCAGGAAACAGCATATTTTCTTTTAAAATTA

GCAGGAAGATGGCCAGTAAAAACAATACACACGGACAACGGAAGCAACTTCACTGG

TGCTACGGTTAAGGCCGCCTGTTGGTGGGCGGGAATCAAGCAGGAATTTGGAATTC

CCTACAATCCCCAATCGCAAGGAGTCGTGGAGAGCATGAACAAGGAGCTGAAGAAG

ATCATCGGACAAGTGAGGGATCAGGCTGAGCACCTGAAGACAGCAGTGCAGATGGC

FIG. IC

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AGTGTTCATCCACAACTTCAAAAGAAAAGGGGGGATTGGGGGGTACAGTGCAGGGG

AAAGGATCGTGGACATCATCGCCACCGACATCCAAACCAAGGAGCTGCAGAAGCAG

ATCACCAAGATCCAGAACTTCCGGGTGTACTACCGCGACAGCCGCAACCCACTGTG

GAAGGGACCAGCAAAGCTCCTCTGGAAGGGAGAGGGGGCAGTGGTGATCCAGGACA

ACAGTGACATCAAAGTGGTGCCAAGGCGCAAGGCCAAGATCATCCGCGACTATGGA

AAACAGATGGCAGGTGATGATTGTGTGGCAAGTAGACAGGATGAGGATTAGAACCT

GGAAGAGCCTGGTGAAGCACCATATG (SEQUENCE ID NO:1)

FIG. ID

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```
>wildtype     TGTACAGAGA TGGAAAAGGA AGGGAAAATT TCAAAAATTG
>mutated      TGTACAGAGA TGGAGAAGGA AGGGAAGATC AGCAAGATCG
#1            .......... .........*  ....*..*.***..*...*
```

```
>wildtype     GGCCTGAAAA TCCATACAAT ACTCCAGTAT TTGCCATAAA
>mutated      GGCCTGAGAA CCCCTACAAC ACTCCAGTCT TCGCAATCAA
#41           .......*...*..*.....*......*..*..*..*.
```

```
>wildtype     GAAAAAAGAC AGTACTAAAT GGAGAAAATT AGTAGATTTC
>mutated      GAAGAAGGAC AGTACCAAGT GGAGAAAGCT GGTGGACTTC
#81           ...*...*.....*..*.......**..*..*..*.
```

```
>wildtype     AGAGAACTTA ATAAGAGAAC TCAAGACTTC TGGGAAGTTC
>mutated      AGAGAGCTGA ACAAGAGAAC TCAGGACTTC TGGGAAGTTC
#121          ......*...*..*.........*...........
```

```
>wildtype     AATTAGGAAT ACCACATCCC GCAGGGTTAA AAAAGAAAAA
>mutated      AGCTGGGCAT CCCACATCCC GCTGGGTTGA AGAAGAAGAA
#161          .**.*..*...*........*...*...*...*.
```

```
>wildtype     ATCAGTAACA GTACTGGATG TGGGTGATGC ATATTTTTCA
>mutated      GTCAGTGACA GTGCTGGATG TGGGTGATGC CTACTTCTCC
#201          *.....*...*.............*..*..*..*.
```

```
>wildtype     GTTCCCTTAG ATGAAGACTT CAGGAAATAT ACTGCATTTA
>mutated      GTTCCCTTGG ACGAGGACTT CAGGAAGTAC ACTGCCTTCA
#241          ........*..*..*.........*..*.......*..*.
```

```
>wildtype     CCATACCTAG TATAAACAAT GAGACACCAG GGATTAGATA
>mutated      CGATACCTAG CATCAACAAC GAGACACCAG GCATCCGCTA
#281          .*.........*..*...*...........*..**.*.
```

```
>wildtype     TCAGTACAAT GTGCTTCCAC AGGGATGGAA AGGATCACCA
>mutated      CCAGTACAAC GTGCTGCCAC AGGGATGGAA GGGATCACCA
#321          *........*...*.......*............*.
```

```
>wildtype     GCAATATTCC AAAGTAGCAT GACAAAAATC TTAGAGCCTT
>mutated      GCCATCTTTC AAAGCAGCAT GAGCAAGATC CTGGAGCCCT
#361          ..*..*...*........*...*..*....*.*..*...*.
```

```
>wildtype     TTAGAAAACA AAATCCAGAC ATAGTTATCT ATCAATACAT
>mutated      TCCGCAAGCA AAACCCAGAC ATCGTGATCT ATCAGTACAT
#401          .**.*..*.......*.........*..*........*.
```

FIG. 2A

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```
>wildtype      GGATGATTTG TATGTAGGAT CTGACTTAGA AATAGGGCAG
>mutated       GGACGACCTC TACGTAGGAA GTGACCTGGA GATCGGGCAG
#441           .........................................
                  *  ** *    *      * *   * *  * *  * *

>wildtype      CATAGAACAA AAATAGAGGA GCTGAGACAA CATCTGTTGA
>mutated       CACAGGACCA AGATCGAGGA GCTGAGACAG CATCTGTTGA
#481           .........................................
                 *   *   *    *   *                *

>wildtype      GGTGGGGACT TACCACACCA GACAAAAAAC ATCAGAAAGA
>mutated       GGTGGGGACT GACCACACCA GACAAGAAGC ACCAGAAGGA
#521           .........................................
                          *                *   *     *    *

>wildtype      ACCTCCATTC CTTTGGATGG GTTATGAACT CCATCCTGAT
>mutated       ACCTCCCTTC CTGTGGATGG GCTACGAACT GCATCCTGAC
#561           .........................................
                     *        *         *  *        *       *

>wildtype      AAATGGACAG TACAGCCTAT AGTGCTGCCA GAAAAAGACA
>mutated       AAGTGGACAG TGCAGCCCAT CGTGCTGCCT GAGAAGGACA
#601           .........................................
                 *         *      *    *        *      * *

>wildtype      GCTGGACTGT CAATGACATA CAGAAGTTAG TGGGGAAATT
>mutated       GCTGGACTGT GAACGACATA CAGAAGCTCG TGGGCAAGTT
#641           .........................................
                          * *               * *        *  *

>wildtype      GAATTGGGCA AGTCAGATTT ACCCAGGGAT TAAAGTAAGG
>mutated       GAACTGGGCA AGCCAGATCT ACCCAGGCAT CAAAGTTAGG
#681           .........................................
                 *          *       *          * *  *    *

>wildtype      CAATTATGTA AAACTCCTTAG AGGAACCAAA GCACTAACAG
>mutated       CAGCTGTGCA AGCTGCTTCG AGGAACCAAG GCACTGACAG
#721           .........................................
                 ** * *    *    *   *            *    *

>wildtype      AAGTAATACC ACTAACAGAA GAAGCAGAGC TAGAACTGGC
>mutated       AAGTGATCCC ACTGACAGAG GAAGCAGAGC TAGAACTGGC
#761           .........................................
                   *   *       *    *

>wildtype      AGAAAACAGA GAGATTCTAA AAGAACCAGT ACATGGAGTG
>mutated       AGAGAACCGA GAGATCCTGA AGGAGCCAGT ACATGGAGTG
#801           .........................................
                 *    *        * *    *  *

>wildtype      TATTATGACC CATCAAAAGA CTTAATAGCA GAAATACAGA
>mutated       TACTACGACC CAAGCAAGGA CCTGATCGCA GAGATCCAGA
#841           .........................................
                 * *      *** *    * *  *        * *
```

FIG. 2B

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```
>wildtype     AGCAGGGGCA AGGCCAATGG ACATATCAAA TTTATCAAGA
>mutated      AGCAGGGGCA AGGCCAATGG ACCTACCAAA TCTACCAGGA
#881          ..................................................
                                      *  *      *  *  *

>wildtype     GCCATTTAAA AATCTGAAAA CAGGAAAATA TGCAAGAATG
>mutated      GCCCTTCAAG AACCTGAAGA CAGGCAAGTA CGCAAGGATG
#921          ..................................................
                 *   *   *   *       *      *  *   *   *

>wildtype     AGGGGTGCCC ACACTAATGA TGTAAAACAA TTAACAGAGG
>mutated      AGGGGTGCCC ACACCAACGA TGTGAAGCAG CTGACAGAGG
#961          ..................................................
                               *  *       *  *   *  * *

>wildtype     CAGTGCAAAA AATAACCACA GAAAGCATAG TAATATGGGG
>mutated      CAGTGCAGAA GATCACCACA GAGAGCATCG TGATCTGGGG
#1001         ..................................................
                        *    *   *       *      *   *   *

>wildtype     AAAGACTCCT AAATTTAAAC TGCCCATACA AAAGGAAACA
>mutated      CAAGACTCCC AAGTTCAAGC TGCCCATACA GAAGGAGACA
#1041         ..................................................
              *       *      *   *   *            *      *

>wildtype     TGGGAAACAT GGTGGACAGA GTATTGGCAA GCCACCTGGA
>mutated      TGGGAGACAT GGTGGACCGA GTACTGGCAA GCCACCTGGA
#1081         ..................................................
                   *              *         *

>wildtype     TTCCTGAGTG GGAGTTTGTT AATACCCCTC CTTTAGTGAA
>mutated      TCCCTGAGTG GGAGTTCGTG AACACCCCTC CCTTGGTGAA
#1121         ..................................................
                *                *  *      *         *  *

>wildtype     ATTATGGTAC CAGTTAGAGA AAGAACCCAT AGTAGGAGCA
>mutated      ACTGTGGTAT CAGCTGGAGA AGGAACCCAT CGTGGGAGCA
#1161         ..................................................
               *  *      *      *  *         *         *  *

>wildtype     GAAACCTTCT ATGTAGATGG GGCAGCTAAC AGGGAGACTA
>mutated      GAGACCTTCT ACGTGGATGG GGCAGCCAAC AGGGAGACCA
#1201         ..................................................
                  *          *   *            *            *

>wildtype     AATTAGGAAA AGCAGGATAT GTTACTAATA GAGGAAGACA
>mutated      AGCTGGGCAA GGCAGGCTAC GTGACCAACC GAGGACGACA
#1241         ..................................................
               ** *   *      *      *  *      *  *   **       *

>wildtype     AAAAGTTGTC ACCCTAACTG ACACAACAAA TCAGAAGACT
>mutated      GAAAGTGGTG ACCCTGACTG ACACCACCAA CCAGAAGACT
#1281         ..................................................
              *      *  *      *         *  *   *
```

FIG. 2C

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```
>wildtype     GAGTTACAAG CAATTTATCT AGCTTTGCAG GATTCGGGAT
>mutated      GAGCTGCAAG CCATCTACCT AGCTCTGCAA GACAGCGGAC
#1321         .........................................
              *  *       *   *   *        *    *   ****   *


>wildtype     TAGAAGTAAA CATAGTAACA GACTCACAAT ATGCATTAGG
>mutated      TGGAAGTGAA CATCGTGACA GACTCACAGT ACGCACTGGG
#1361         .........................................
               *       *       *   *            *    *    * *


>wildtype     AATCATTCAA GCACAACCAG ATCAAAGTGA ATCAGAGTTA
>mutated      CATCATCCAA GCACAACCAG ACCAATCCGA GTCAGAGCTG
#1401         .........................................
              *      *             *    ***    *      * *


>wildtype     GTCAATCAAA TAATAGAGCA GTTAATAAAA AAGGAAAAGG
>mutated      GTGAACCAGA TCATCGAGCA GCTGATCAAG AAGGAGAAAG
#1441         .........................................
                *   *   *      *   *       *  *  *   *      * *


>wildtype     TCTATCTGGC ATGGGTACCA GCACACAAAG GAATTGGAGG
>mutated      TGTACCTGGC ATGGGTACCA GCACACAAAG GAATTGGAGG
#1481         .........................................
               *   *


>wildtype     AAATGAACAA GTAGATAAAT TAGTCAGTGC TGGAATCAGG
>mutated      AAATGAACAA GTAGATAAAT TAGTCAGTGC TGGGATCCGG
#1521         .........................................
                                                  *   *


>wildtype     AAAGTACTAT TTTTAGATGG AATAGATAAG GCCCAAGATG
>mutated      AAGGTGCTGT TCCTGGACGG GATCGATAAG GCCCAAGATG
#1561         .........................................
                *   *   *   ** *   *      *   *


>wildtype     AACATGAGAA ATATCACAGT AATTGGAGAG CAATGGCTAG
>mutated      AACATGAGAA GTACCACTCC AACTGGCGCG CTATGGCCAG
#1601         .........................................
                         *   *   ***    *     * *    *      *


>wildtype     TGATTTTAAC CTGCCACCTG TAGTAGCAAA AGAAATAGTA
>mutated      CGACTTCAAC CTGCCACCTG TAGTAGCAAA AGAAATAGTA
#1641         .........................................
              *   *   *


>wildtype     GCCAGCTGTG ATAAATGTCA GCTAAAAGGA GAAGCCATGC
>mutated      GCCAGCTGTG ATAAATGTCA GCTAAAAGGA GAAGCCATGC
#1681         .........................................


>wildtype     ATGGACAAGT AGACTGTAGT CCAGGAATAT GGCAACTAGA
>mutated      ATGGACAAGT AGACTGTAGT CCAGGAATAT GGCAGCTGGA
#1721         .........................................
                                                  *   *
```

FIG. 2D

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```
>wildtype      TTGTACACAT TTAGAAGGAA AAGTTATCCT GGTAGCAGTT
>mutated       CTGCACGCAC CTGGAGGGGA AGGTGATCCT GGTAGCAGTT
#1761
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
               *   *   *   *  *  *   *   *  *


>wildtype      CATGTAGCCA GTGGATATAT AGAAGCAGAA GTTATTCCAG
>mutated       CATGTAGCCA GTGGATATAT AGAAGCAGAA GTTATCCCTG
#1801
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                                                         *   *


>wildtype      CAGAAACAGG GCAGGAAACA GCATATTTTC TTTTAAAATT
>mutated       CTGAAACTGG GCAGGAAACA GCATATTTTC TTTTAAAATT
#1841
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                *       *


>wildtype      AGCAGGAAGA TGGCCAGTAA AAACAATACA TACAGACAAT
>mutated       AGCAGGAAGA TGGCCAGTAA AAACAATACA CACGGACAAC
#1881
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                                                    *   *       *


>wildtype      GGCAGCAATT TCACCAGTGC TACGGTTAAG GCCGCCTGTT
>mutated       GGAAGCAACT TCACTGGTGC TACGGTTAAG GCCGCCTGTT
#1921
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                 *         *       *  *


>wildtype      GGTGGGCGGG AATCAAGCAG GAATTTGGAA TTCCCTACAA
>mutated       GGTGGGCGGG AATCAAGCAG GAATTTGGAA TTCCCTACAA
#1961
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .


>wildtype      TCCCCAAAGT CAAGGAGTAG TAGAATCTAT GAATAAAGAA
>mutated       TCCCCAATCG CAAGGAGTCG TGGAGAGCAT GAACAAGGAG
#2001
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                      * *  *           *    *   * ***       *    *   *


>wildtype      TTAAAGAAAA TTATAGGACA GGTAAGAGAT CAGGCTGAAC
>mutated       CTGAAGAAGA TCATCGGACA AGTGAGGGAT CAGGCTGAGC
#2041
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                *  *       *    *    *       *    *   *                  *


>wildtype      ATCTTAAGAC AGCAGTACAA ATGGCAGTAT TCATCCACAA
>mutated       ACCTGAAGAC AGCAGTGCAG ATGGCAGTGT TCATCCACAA
#2081
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                *  *              *   *          *


>wildtype      TTTTAAAAGA AAAGGGGGGA TTGGGGGGTA CAGTGCAGGG
>mutated       CTTCAAAAGA AAAGGGGGGA TTGGGGGGTA CAGTGCAGGG
#2121
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                *  *


>wildtype      GAAAGAATAG TAGACATAAT AGCAACAGAC ATACAAACTA
>mutated       GAAAGGATCG TGGACATCAT CGCCACCGAC ATCCAAACCA
#2161
               . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
                   *   *   *       *   *   *   *       *       *
```

FIG. 2E

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Inventor: PAVLAKIS, George - Attorney Docket No.: 015280-257300US
Replacement Sheet

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```
>wildtype     AAGAATTACA AAAACAAATT ACAAAAATTC AAAATTTTCG
>mutated      AGGAGCTGCA GAAGCAGATC ACCAAGATCC AGAACTTCCG
#2201         .......... .......... .......... ..........
               *   ** *    *    *    *    *   *   *   * *


>wildtype     GGTTTATTAC AGGGACAGCA GAAATCCACT TTGGAAAGGA
>mutated      GGTGTACTAC CGCGACAGCC GCAACCCACT GTGGAAGGGA
#2241         .......... .......... .......... ..........
                 *    *      *  *     *    *  *     *     *


>wildtype     CCAGCAAAGC TCCTCTGGAA AGGTGAAGGG GCAGTAGTAA
>mutated      CCAGCAAAGC TCCTCTGGAA GGGAGAGGGG GCAGTGGTGA
#2281         .......... .......... .......... ..........
                                    *  *  *         * *


>wildtype     TACAAGATAA TAGTGACATA AAAGTAGTGC CAAGAAGAAA
>mutated      TCCAGGACAA CAGTGACATC AAAGTGGTGC CAAGGCGCAA
#2321         .......... .......... .......... ..........
               *   *   *    *       *      *      ** *


>wildtype     AGCAAAGATC ATTAGGGATT ATGGAAAACA GATGGCAGGT
>mutated      GGCCAAGATC ATCCGCGACT ATGGAAAACA GATGGCAGGT
#2361         .......... .......... .......... ..........
               *  *         ** *  *


>wildtype     GATGATTGTG TGGCAAGTAG ACAGGATGAG GATTAGAACA
>mutated      GATGATTGTG TGGCAAGTAG ACAGGATGAG GATTAGAACC
#2401         .......... .......... .......... ..........
                                                        *


>wildtype     TGGAAAAGTT TAGTAAAACA CCATATG
>mutated      TGGAAGAGCC TGGTGAAGCA CCATATG
#2441         .......... .......... .......
                  *   **   *   *   *
```

FIG. 2F

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```
SIV gag        -----------------------------------------------------
  #1           ...................................................
               ATGGGCGTGAGAAACTCCGTCTTGTCAGGGAAGAAAGCAG


SIV gag        -----------------------------------------------------
  #41          ...................................................
               ATGAATTAGAAAAAATTAGGCTACGACCCAACGGAAAGAA


SIV gag        -----------------------------------------------------
  #81          ...................................................
               AAAGTACATGTTGAAGCATGTAGTATGGGCAGCAAATGAA


SIV gag        -----------------------------------------------------
  #121         ...................................................
               TTAGATAGATTTGGATTAGCAGAAAGCCTGTTGGAGAACA


SIV gag        -----------------------------------------------------
  #161         ...................................................
               AAGAAGGATGTCAAAAAATACTTTCGGTCTTAGCTCCATT


SIV gag        -----------------------------------------------------
  #201         ...................................................
               AGTGCCAACAGGCTCAGAAAATTTAAAAAGCCTTTATAAT


SIV gag        -----------------------------------------------------
  #241         ...................................................
               ACTGTCTGCGTCATCTGGTGCATTCACGCAGAAGAGAAAG


SIV gag        -----------------------------------------------------
SIVgagDX..                                          ----------
  #281         ...................................................
               TGAAACACACTGAGGAAGCAAAACAGATAGTGCAGAGACA


SIV gag        --------------------A--A-----T-----A--A
SIVgagDX..     --------------------C--C-----C-----G--G
  #321         ...................................................
               CCTAGTGGTGGAAACAGGAACMACMGAAACYATGCCRAAR


SIV gag        --AAG-A----------------------------------
SIVgagDX..     --CTC-C----------------------------------
  #361         ...................................................
               ACMWSTMGACCAACAGCACCATCTAGCGGCAGAGGAGGAA
```

FIG. 4A

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```
SIV gag      -T-----------A--A--A------------T---------
SIVgagDX..  -C-----------G--G--C------------C---------
#401
            ..........................................
            AYTACCCAGTACARCARATMGGTGGTAACTAYGTCCACCT

SIV gag      ----T-AAG----------AT-A--T--C-----A--AT--
SIVgagDX..  ----C-GTC----------CC-G--C--T-----C--GC--
#441
            ..........................................
            GCCAYTRWSCCCGAGAACMYTRAAYGCYTGGGTMAARYTG

SIV gag      --A------A------A--T----------------------
SIVgagDX..  --C------G------G--C----------------------
#481
            ..........................................
            ATMGAGGARAAGAARTTYGGAGCAGAAGTAGTGCCAGGAT

SIV gag      -T-------------------------------T-----T--
SIVgagDX..  -C-------------------------------C-----C--
#521
            ..........................................
            TYCAGGCACTGTCAGAAGGTTGCACCCCCTAYGACATYAA

SIV gag      T------T-A--T--T--G-------------A---------
SIVgagDX..  C------C-G--C--C--T-------------G---------
#561
            ..........................................
            YCAGATGYTRAAYTGYGTKGGAGACCATCARGCGGCTATG

SIV gag      -----T---A-A--T--T--A---------------------
SIVgagDX..  -----C---C-T--C--C--C---------------------
#601
            ..........................................
            CAGATYATCMGWGAYATYATMAACGAGGAGGCTGCAGATT

SIV gag      ------------------------------------------
SIVgagDX..  ------------------------------------------
#641
            ..........................................
            GGGACTTGCAGCACCCACAACCAGCTCCACAACAAGGACA

SIV gag      --------------------------T--T--------A--T
SIVgagDX..  --------------------------C--C--------C--C
#681
            ..........................................
            ACTTAGGGAGCCGTCAGGATCAGAYATYGCAGGAACMACY

SIV gag      AGT------A--T------A-----------------A-A--A-
SIVgagDX..  TCC------T--C------G-----------------C-T--G-
#721
            ..........................................
            WSYTCAGTWGAYGAACARATCCAGTGGATGTACMGWCARC
```

FIG. 4B

Application Serial No. 10/644,027 - Filed: August 19, 2003
Inventor: PAVLAKIS, George - Attorney Docket No.: 015280-257300US
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```
SIV gag       -------C--A---------------------T---A-GA-------
SIVgagDX..-------G--C---------------------C---C-TC-------
   #761       ..................................................
              AGAACCCSATMCCAGTAGGCAACATYTACMGKMGATGGAT


SIV gag       ---A-----GT----A--A--T--CA-A-----T-----A
SIVgagDX..---G-----TC----G--G--C--TC-T-----C-----G
   #801       ..................................................
              CCARCTGGGKYTGCARAARTGYGTYMGWATGTAYAACCCR


SIV gag       --A----------------------------------------
SIVgagDX..--C-----------------------
   #841       ..................................................
              ACMAACATTCTAGATGTAAAACAAGGGCCAAAAGAGCCAT


SIV gag       --------------------------------------------
   #881       ..................................................
              TTCAGAGCTATGTAGACAGGTTCTACAAAAGTTTAAGAGC


SIV gag       --------------------------------------------
   #921       ..................................................
              AGAACAGACAGATGCAGCAGTAAAGAATTGGATGACTCAA


SIV gag       --------------------------------------------
   #961       ..................................................
              ACACTGCTGATTCAAAATGCTAACCCAGATTGCAAGCTAG


SIV gag       --------------------------------------------
   #1001      ..................................................
              TGCTGAAGGGGCTGGGTGTGAATCCCACCCTAGAAGAAAT


SIV gag       --------------------------------------------
   #1041      ..................................................
              GCTGACGGCTTGTCAAGGAGTAGGGGGGCCGGGACAGAAG


SIV gag       --------------------------------------------
   #1081      ..................................................
              GCTAGATTAATGGCAGAAGCCCTGAAAGAGGCCCTCGCAC


SIV gag       --------------------------------------------
   #1121      ..................................................
              CAGTGCCAATCCCTTTTGCAGCAGCCCAACAGAGGGGACC


SIV gag       --------------------------------------------
   #1161      ..................................................
              AAGAAAGCCAATTAAGTGTTGGAATTGTGGGAAAGAGGGA
```

FIG. 4C

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SIV gag
#1201

. . . .
CACTCTGCAAGGCAATGCAGAGCCCCAAGAAGACAGGGAT

SIV gag
#1241

. . . .
GCTGGAAATGTGGAAAAATGGACCATGTTATGGCCAAATG

SIV gag
#1281

. . . .
CCCAGACAGACAGGCGGGTTTTTTAGGCCTTGGTCCATGG

SIV gag
#1321

. . . .
GGAAAGAAGCCCCGCAATTTCCCCATGGCTCAAGTGCATC

SIV gag
#1361

. . . .
AGGGGCTGATGCCAACTGCTCCCCCAGAGGACCCAGCTGT

SIV gag
#1401

. . . .
GGATCTGCTAAAGAACTACATGCAGTTGGGCAAGCAGCAG

SIV gag
#1441

. . . .
AGAGAAAGCAGAGAGAAAGCAGAGAGAAGCCTTACAAGG

SIV gag
#1481

. . . .
AGGTGACAGAGGATTTGCTGCACCTCAATTCTCTCTTTGG

SIV gag
#1521

. . . .
AGGAGACCAGTAG

FIG. 4D

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BsrGI (37)
```
  1  CCTGGCCATTGCATACGTTGTATCCATATCATAATATGTACATTTATATTGGCTCATGTCCAACATTACCGCCATGTTGA
 81  CATTGATTATTGACTAGTTATTAATAGTAATCAATTACGGGGTCATTAGTTCATAGCCCATATATGGAGTTCCGCGTTAC
161  ATAACTTACGGTAAATGGCCCGCCTGGCTGACCGCCCAACGACCCCCGCCCATTGACGTCAATAATGACGTATGTTCCCA
241  TAGTAACGCCAATAGGGACTTTCCATTGACGTCAATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAA
321  GTGTATCATATGCCAAGTACGCCCCCTATTGACGTCAATGACGGTAAATGGCCCGCCTGGCATTATGCCCAGTACATGAC
```
SnaBI (432)
```
401  CTTATGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCATCGCTATTACCATGGTGATGCGGTTTTGGCAGTACA
481  TCAATGGGCGTGGATAGCGGTTTGACTCACGGGGATTTCCAAGTCTCCACCCCATTGACGTCAATGGGAGTTTGTTTTGG
561  CACCAAAATCAACGGGACTTTCCAAAATGTCGTAACAACTCCGCCCCATTGACGCAAATGGGCGGTAGGCGTGTACGGTG
641  GGAGGTCTATATAAGCAGAGCTCGTTTAGTGAACCGTCAGATCGCCTGGAGACGCCATCCACGCTGTTTTGACCTCCATA
```
SacII (746)
```
721  GAAGACACCGGGACCGATCCAGCCTCCGCGGGCCGCGCTAAGTATGGGATGTCTTGGGAATCAGCTGCTTATCGCCATCT
```

```
                                              1▶ MetGlyCysLeuGl yAsnGl nLeuLeul l eAl al l eL
801  TGCTTTTAAGTGTCTATGGGATCTATTGTACTCTATATGTCACAGTCTTTTATGGTGTACCAGCTTGGAGGAATGCGACA

    13▶ euLeuLeuSer Val TyrGl yl l eTyrCysThr LeuTyrVal Thr Val PheTyrGl yVal ProAl aTrpArgAsnAl aThr
881  ATTCCCCTCTTTTGTGCAACCAAGAATAGGGATACTTGGGGAACAACTCAGTGCCTACCAGATAATGGTGATTATTCAGA

    40▶ l l eProLeuPheCysAl aThr LysAsnArgAspThr TrpGl yThr Thr Gl nCysLeuProAspAsnGl yAspTyrSer Gl
961  AGTGGCCCTTAATGTTACAGAAAGCTTTGATGCCTGGAATAATACAGTCACAGAACAGGCAATAGAGGATGTATGGCAAC

    66▶ uVal Al aLeuAsnVal Thr Gl uSer PheAspAl aTrpAsnAsnThr Val Thr Gl uGl nAl al l eGl uAspVal TrpGl nL
1041 TCTTTGAGACCTCAATAAAGCCTTGTGTAAAATTATCCCCATTATGCATTACTATGAGATGCAATAAAAGTGAGACAGAT

    93▶ euPheGl uThr Ser l l eLysProCysVal LysLeuSer ProLeuCysl l eThr MetArgCysAsnLysSer Gl uThr Asp
1121 AGATGGGGATTGACAAAATCAATAACAACAACAGCATCAACAACATCAACGACAGCATCAGCAAAAGTAGACATGGTCAA

    120▶ ArgTrpGl yLeuThr LysSer l l eThr Thr Thr Al aSer Thr Thr Ser Thr Thr Al aSer Al aLysVal AspMetVal As
1201 TGAGACTAGTTCTTGTATAGCCCAGGATAATTGCACAGGCTTGGAACAAGAGCAAATGATAAGCTGTAAATTCAACATGA

    146▶ nGl uThr Ser Ser Cysl l eAl aGl nAspAsnCysThr Gl yLeuGl uGl nGl uGl nMetl l eSer CysLysPheAsnMetT
                                                                    PstI (1329)
1281 CAGGGTTAAAAAGAGACAAGAAAAAAGAGTACAATGAAACTTGGTACTCTGCAGATTTGGTATGTGAACAAGGGAATAAC

    173▶ hr Gl yLeuLysArgAspLysLysLysGl uTyrAsnGl uThr TrpTyrSer Al aAspLeuVal CysGl uGl nGl yAsnAsn
1361 ACTGGTAATGAAAGTAGATGTTACATGAACCACTGTAACACTTCTGTTATCCAAGAGTCTTGTGACAAACATTATTGGGA

    200▶ Thr Gl yAsnGl uSer ArgCysTyrMetAsnHi sCysAsnThr Ser Val l l eGl nGl uSer CysAspLysHi sTyrTrpAs
1441 TGCTATTAGATTTAGGTATTGTGCACCTCCAGGTTATGCTTTGCTTAGATGTAATGACACACAAATTATTCAGGCTTTATGC

    226▶ pAl al l eArgPheArgTyrCysAl aProProGl yTyrAl aLeuLeuArgCysAsnAspThr AsnTyrSer Gl yPheMetP
1521 CTAAATGTTCTAAGGTGGTGGTCTCTTCATGCACAAGGATGATGGAGACACAGACTTCTACTTGGTTTGGCTTTAATGGA

    253▶ r oLysCysSer LysVal Val Val Ser Ser CysThr ArgMetMetGl uThr Gl nThr Ser Thr TrpPheGl yPheAsnGl y
1601 ACTAGAGCAGAAAATAGAACTTATATTTACTGGCATGGTAGGGATAATAGGACTATAATTAGTTTAAATAAGTATTATAA

    280▶ Thr ArgAl aGl uAsnArgThr Tyrl l eTyrTrpHi sGl yArgAspAsnArgThr l l el l eSer LeuAsnLysTyrTyrAs
1681 TCTAACAATGAAATGTAGAAGACCAGGAAATAAGACAGTTTTACCAGTCACCATTATGTCTGGATTGGTTTTCCACTCAC

    306▶ nLeuThr MetLysCysArgArgProGl yAsnLysThr Val LeuProVal Thr l l eMetSer Gl yLeuVal PheHi sSer G
                        XcmI (1778)
1761 AACCAATCAATGATAGGCCAAAGCAGGCATGGTGTTGGTTTGGAGGAAAATGGAAGGATGCAATAAAAGAGGTGAAGCAG

    333▶ l nProl l eAsnAspArgProLysGl nAl aTrpCysTrpPheGl yGl yLysTrpLysAspAl al l eLysGl uVal LysGl n
1841 ACCATTGTCAAACATCCCAGGTATACTGGAACTAACAATACTGATAAAATCAATTTGACGGCTCCTGGAGGAGGAGATCC

    360▶ Thr l l eVal LysHi sProArgTyrThr Gl yThr AsnAsnThr AspLysl l eAsnLeuThr Al aProGl yGl yGl yAspPr
1921 GGAAGTTACCTTCATGTGGACAAATTGCAGAGGAGAGTTCCTCTACTGTAAAATGAATTGGTTTCTAAATTGGGTAGAAG

    386▶ oGl uVal Thr PheMetTrpThr AsnCysArgGl yGl uPheLeuTyrCysLysMetAsnTrpPheLeuAsnTrpVal Gl uA
2001 ATAGGAATACAGCTAACCAGAAGCCAAAGGAACAGCATAAAAGGAATTACGTGCCATGTCATATTAGACAAATAATCAAC

    413▶ spArgAsnThr Al aAsnGl nLysProLysGl uGl nHi sLysArgAsnTyrVal ProCysHi sl l eArgGl nl l el l eAsn
```

FIG. 17A

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PmlI (2134)

2081 ACTTGGCATAAAGTAGGCAAAAATGTTTATTTGCCTCCAAGAGAGGGAGACCTCACGTGTAACTCCACAGTGACCAGTCT

440▶ Thr TrpHis LysVal Gl yLysAsnVal TyrLeuProProArgGl uGl yAspLeuThr CysAsnSer Thr Val Thr Ser Le
2161 CATAGCAAACATAGATTGGATTGATGGAAACCAAACTAATATCACCATGAGTGCAGAGGTGGCAGAACTGTATCGATTGG

466▶ u I I eAl aAsn I I eAspTrp I I eAspGl yAsnGl nThr Asn I I eThr Met Ser Al aGl uVal Al aGl uLeuTyrArgLeuG
2241 AATTGGGAGATTATAAATTAGTAGAGATCACTCCAATTGGCTTGGCCCCCACAGATGTGAAGAGGTACACTACTGGTGGC

493▶ l uLeuGl yAspTyrLysLeuVal Gl u I I eThr Pro I I eGl yLeuAl aProThrAspVal LysArgTyrThr Thr Gl yGl y
BspMI (2378)
2321 ACCTCAAGAAATAAAAGAGGGGTCTTTGTGCTAGGGTTCTTGGGTTTTCTCGCAACGGCAGGTTCTGCAATGGGAGCCGC

520▶ Thr Ser ArgAsnLys ArgGl yVal PheVal LeuGl yPheLeuGl yPheLeuAl aThr Al aGl ySer Al aMet Gl yAl aAl
2401 CAGCCTGACCCTCACGGCACAGTCCCGAACTTTATTGGCTGGGATAGTCCAACAGCAGCAACAGCTGTTGGACGTGGTCA

546▶ aSer LeuThr LeuThr Al aGl nSer ArgThr LeuLeuAl aGl y I I eVal Gl nGl nGl nGl nLeuLeuAspVal Val L
Eam1105I (2502)
2481 AGAGACAACAAGAATTGTTGCGACTGACCGTCTGGGGAACAAAGAACCTCCAGACTAGGGTCACTGCCATCGAGAAGTAC

573▶ ysArgGl nGl nGl uLeuLeuArgLeuThr Val TrpGl yThr LysAsnLeuGl nThr ArgVal Thr Al a I I eGl uLysTyr
2561 TTAAAGGACCAGGCGCAGCTGAATGCTTGGGGATGTGCGTTTAGACAAGTCTGCCACACTACTGTACCATGGCCAAATGC

600▶ LeuLysAspGl nAl aGl nLeuAsnAl aTrpGl yCysAl aPheArgGl nVal CysHis Thr Thr Val ProTrpProAsnAl
2641 AAGTCTAACACCAAAGTGGAACAATGAGACTTGGCAAGAGTGGGAGCGAAAGGTTGACTTCTTGGAAGAAAATATAACAG

626▶ aSer LeuThr ProLys TrpAsnAsnGl uThr TrpGl nGl uTrpGl uArgLys Val AspPheLeuGl uGl uAsn I I eThr A
2721 CCCTCCTAGAGGAGGCACAAATTCAACAAGAGAAGAACATGTATGAATTACAAAAGTTGAATAGCTGGGATGTGTTTGGC

653▶ l aLeuLeuGl uGl uAl aGl n I I eGl nGl nGl uLysAsnMet TyrGl uLeuGl nLysLeuAsnSer TrpAspVal PheGl y
2801 AATTGGTTTGACCTTGCTTCTTGGATAAAGTATATACAATATGGAGTTTATATAGTTGTAGGAGTAATACTGTTAAGAAT

680▶ AsnTrpPheAspLeuAl aSer Trp I I eLysTyr I I eGl nTyrGl yVal Tyr I I eVal Val Gl yVal I I eLeuLeuArg I I
2881 AGTGATCTATATAGTACAAATGCTAGCTAAGTTAAGGCAGGGGTATAGGCCAGTGTTCTCTTCCCCACCCTCTTATTTCC

706▶ eVal I I eTyr I I eVal Gl nMet LeuLeuAl aLysLeuArgGl nGl yTyrArgProVal PheSer Ser ProProSer TyrPheG
PpuMI (2979)
2961 AGCAGACCCATATCCAACAGGACCCGGCACTGCCAACCAGAGAAGGCAAAGAAAGAGACGGTGGAGAAGGCGGTGGCAAC

733▶ l nGl nThr His I I eGl nGl nAspProAl aLeuProThr ArgGl uGl yLysGl uArgAspGl yGl yGl uGl yGl yGl yAsn
3041 AGCTCCTGGCCTTGGCAGATAGAATATATCCACTTTCTTATTCGTCAGCTTATTAGACTCTTGACTTGGCTATTCAGTAA

760▶ Ser Ser TrpProTrpGl n I I eGl uTyr I I eHis PheLeu I I eArgGl nLeu I I eArgLeuLeuThr TrpLeuPheSer As
3121 CTGTAGGACTTTGCTATCGAGAGTATACCAGATCCTCCAACCAATACTCCAGAGGCTCTCTGCGACCCTACAGAGGATTC

786▶ nCysArgThr LeuLeuSer ArgVal TyrGl n I I eLeuGl nPro I I eLeuGl nArgLeuSer Al aThr LeuGl nArg I I eA
Bsu36I (3208)
3201 GAGAAGTCCTCAGGACTGAACTGACCTACCTACAATATGGGTGGAGCTATTTCCATGAGGCGGTCCAGGCCGTCTGGAGA

813▶ r gGl uVal LeuArgThr Gl uLeuThr TyrLeuGl nTyrGl yTrpSer TyrPheHis Gl uAl aVal Gl nAl aVal TrpArg
3281 TCTGCGACAGAGACTCTTGCGGGCGCGTGGGGAGACTTATGGGAGACTCTTAGGAGAGGTGGAAGATGGATACTCGCAAT

840▶ Ser Al aThr Gl uThr LeuAl aGl yAl aT rpGl yAspLeuT rpGl uThr LeuArgArgGl yGl yA rgTrp I I eLeuAl a I I
BamHI (3418)
EcoRI (3412)
3361 CCCCAGGAGGATTAGACAAGGGCTTGAGCTCACTCTCTTGTGAGGGACAGAGAATTCGGATCCactagttctagaCTCGA

                                                          ◀─────────

866▶ eProArgArg I I eArgGl nGl yLeuGl uLeuThr LeuLeu• • •
Eco47III (3457)
3441 GGGGGGGCCCGGTACGAGCGCTTAGCTAGCTAGAGACCACCTCCCCTGCGAGCTAAGCTGGACAGCCAATGACGGGTAAG

3521 AGAGTGACATTTTTCACTAACCTAAGACAGGAGGGCCGTCAGAGCTACTGCCTAATCCAAAGACGGGTAAAAGTGATAAA

BstEII (3673)
3601 AATGTATCACTCCAACCTAAGACAGGCGCAGCTTCCGAGGGATTTGTCGTCTGTTTTATATATATTTAAAAGGGTGACCT

FIG. 17B

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                                                                   BsaBI (3740)
3681  GTCCGGAGCCGTGCTGCCCGGATGATGTCTTGGTCTAGACTCGAGGGGGGGCCCGGTACGATCCAGATCTGCTGTGCCTT

3761  CTAGTTGCCAGCCATCTGTTGTTTGCCCCTCCCCCGTGCCTTCCTTGACCCTGGAAGGTGCCACTCCCACTGTCCTTTCC

3841  TAATAAAATGAGGAAATTGCATCGCATTGTCTGAGTAGGTGTCATTCTATTCTGGGGGGTGGGGTGGGGCAGCACAGCAA

                 SphI (3948)                    KpnI (3976)
3921  GGGGGAGGATTGGGAAGACAATAGCAGGCATGCTGGGGATGCGGTGGGCTCTATGGGTACCCAGGTGCTGAAGAATTGAC

                                         BstXI (4060)
4001  CCGGTTCCTCCTGGGCCAGAAAGAAGCAGGCACATCCCCTTCTCTGTGACACACCCTGTCCACGCCCCTGGTTCTTAGTT

4081  CCAGCCCCACTCATAGGACACTCATAGCTCAGGAGGGCTCCGCCTTCAATCCCACCCGCTAAAGTACTTGGAGCGGTCTC

4161  TCCCTCCCTCATCAGCCCACCAAACCAAACCTAGCCTCCAAGAGTGGGAAGAAATTAAAGCAAGATAGGCTATTAAGTGC

                                                      XmnI (4293)
4241  AGAGGGAGAGAAAATGCCTCCAACATGTGAGGAAGTAATGAGAGAAATCATAGAATTTCTTCCGCTTCCTCGCTCACTGA

4321  CTCGCTGCGCTCGGTCGTTCGGCTGCGGCGAGCGGTATCAGCTCACTCAAAGGCGGTAATACGGTTATCCACAGAATCAG
4401  GGGATAACGCAGGAAAGAACATGTGAGCAAAAGGCCAGCAAAAGGCCAGGAACCGTAAAAAGGCCGCGTTGCTGGCGTTT
4481  TTCCATAGGCTCCGCCCCCCTGACGAGCATCACAAAAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATA
4561  AAGATACCAGGCGTTTCCCCCTGGAAGCTCCCTCGTGCGCTCTCCTGTTCCGACCCTGCCGCTTACCGGATACCTGTCCG
4641  CCTTTCTCCCTTCGGGAAGCGTGGCGCTTTCTCAATGCTCACGCTGTAGGTATCTCAGTTCGGTGTAGGTCGTTCGCTCC
4721  AAGCTGGGCTGTGTGCACGAACCCCCCGTTCAGCCCGACCGCTGCGCCTTATCCGGTAACTATCGTCTTGAGTCCAACCC
4801  GGTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGGATTAGCAGAGCGAGGTATGTAGGCGGTGCTACAG
4881  AGTTCTTGAAGTGGTGGCCTAACTACGGCTACACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACC
4961  TTCGGAAAAAGAGTTGGTAGCTCTTGATCCGGCAAACAAACCACCGCTGGTAGCGGTGGTTTTTTTGTTTGCAAGCAGCA
5041  GATTACGCGCAGAAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGGGTCTGACGCTCAGTGGAACGAAAACT
5121  CACGTTAAGGGATTTTGGTCATGAGATTATCAAAAAGGATCTTCACCTAGATCCTTTTAAATTAAAAATGAAGTTTTAAA
5201  TCAATCTAAAGTATATATGAGTAAACTTGGTCTGACAGTTACCAATGCTTAATCAGTGAGGCACCTATCTCAGCGATCTG
5281  TCTATTTCGTTCATCCATAGTTGCCTGACTCCGGGGGGGGGGGGCGCTGAGGTCTGCCTCGTGAAGAAGGTGTTGCTGAC

             StuI (5368)
5361  TCATACCAGGCCTGAATCGCCCCATCATCCAGCCAGAAAGTGAGGGAGCCACGGTTGATGAGAGCTTTGTTGTAGGTGGA
5441  CCAGTTGGTGATTTTGAACTTTTGCTTTGCCACGGAACGGTCTGCGTTGTCGGGAAGATGCGTGATCTGATCCTTCAACT
5521  CAGCAAAAGTTCGATTTATTCAACAAAGCCGCCGTCCCGTCAAGTCAGCGTAATGCTCTGCCAGTGTTACAACCAATTAA
5601  CCAATTCTGATTAGAAAAACTCATCGAGCATCAAATGAAACTGCAATTTATTCATATCAGGATTATCAATACCATATTTT
              271◄PhePheGluAspLeuMetLeuHisPheGlnLeuLysAsnMetAspProAsnAspIleGlyTyrLysG
5681  TGAAAAGCCGTTTCTGTAATGAAGGAGAAAACTCACCGAGGCAGTTCCATAGGATGGCAAGATCCTGGTATCGGTCTGC
      248◄lnPheLeuArgLysGlnLeuSerProSerPheGluGlyLeuCysAsnTrpLeuIleAlaLeuAspGlnTyrArgAspAla
5761  GATTCCGACTCGTCCAACATCAATACAACCTATTAATTTCCCCTCGTCAAAAATAAGGTTATCAAGTGAGAAATCACCAT
      222◄IleGlyIleArgGlyTyrValAspIleIleCysGlyTyrIleGluLeuGluIleGluAspPheIleLeuAsnAspLeuSerPheAspGlyHi
5841  GAGTGACGACTGAATCCGGTGAGAATGGCAAAAGCTTATGCATTTCTTTCCAGACTTGTTCAACAGGCCAGCCATTACGC
      195◄sThrValValSerAspProSerPheProLeuLeuLysHisMetGluLysTrpValGlnGluValProTrpGlyAsnArgG
                                                              PvuI (5993)
                                                              SgfI (5992)
5921  TCGTCATCAAAATCACTCGCATCAACCAAACCGTTATTCATTCGTGATTGCGCCTGAGCGAGACGAAATACGCGATCGCT
      168◄luAspAspPheAspSerAlaAspValLeuGlyAsnAsnMetArgSerGlnAlaGlnAlaLeuArgPheValArgAspSer
                               BsrFI (6036)       SspI (6067)
6001  GTTAAAAGGACAATTACAAACAGGAATCGAATGCAACCGGCGCAGGAACACTGCCAGCGCATCAACAATATTTTCACCTG
      142◄AsnPheProCysAsnCysValProIleSerHisLeuArgArgLeuPheValAlaAlaLeuAlaAspValIleAsnGluGlySe
                                   SmaI (6118)
6081  AATCAGGATATTCTTCTAATACCTGGAATGCTGTTTTCCCGGGGATCGCAGTGGTGAGTAACCATGCATCATCAGGAGTA
      115◄rAspProTyrGluGluLeuValGlnPheAlaThrLysGlyProIleAlaThrThrLeuLeuTrpAlaAspAspProThrA
6161  CGGATAAAATGCTTGATGGTCGGAAGAGGCATAAATTCCGTCAGCCAGTTTAGTCTGACCATCTCATCTGTAACATCATT
      88◄rgIlePheHisLysIleThrProLeuProMetPheGluThrLeuTrpAsnLeuArgValMetGluAspThrValAspAsn
6241  GGCAACGCTACCTTTGCCATGTTTCAGAAACAACCTCTGGCGCCATCGGTCGGCCTTCCCATACAATCGATAGATTGTCGCACCTG
      62◄AlaValSerGlyLysGlyHisLeuLeuPheLeuGluProAlaAspProLysGlyTyrLeuArgTyrIleThrAlaGlySe
                  NruI (6335)
6321  ATTGCCCGACATTATCGCGAGCCCATTTATACCCATATAAATCAGCATCCATGTTGGAATTTAATCGCGGCCTCGAGCAA
      35◄rGlnGlyValAsnAspArgAlaTrpLysTyrGlyTyrLeuAspAlaAspMetAsnSerAsnLeuArgProArgSerCysS
6401  GACGTTTCCCGTTGAATATGGCTCATAACACCCCTTGTATTACTGTTTATGTAAGCAGACAGTTTTATTGTTCATGATGA
      8◄erThrGluArgGlnIleIleHisSerMet
                                    DraIII (6523)
6481  TATATTTTTTATCTTGTGCAATGTAACATCAGAGATTTTGAGACACAACGTGGCTTTCCCCCCCCCCCCCATTATTGAAGCA
6561  TTTATCAGGGTTATTGTCTCATGAGCGGATACATATTTGAATGTATTTAGAAAAATAAACAAATAGGGGTTCCGCGCACA
```

FIG. 17C

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6641 TTTCCCCGAAAAGTGCCACCTGACGTCTAAGAAACCATTATTATCATGACATTAACCTATAAAAATAGGCGTATCACGAG
6721 GCCCTTTCGTCTCGCGCGTTTCGGTGATGACGGTGAAAACCTCTGACACATGCAGCTCCCGGAGACGGTCACAGCTTGTC
6801 TGTAAGCGGATGCCGGGAGCAGACAAGCCCGTCAGGGCGCGTCAGCGGGTGTTGGCGGGTGTCGGGGCTGGCTTAACTAT
6881 GCGGCATCAGAGCAGATTGTACTGAGAGTGCACCATATGCGGTGTGAAATACCGCACAGATGCGTAAGGAGAAAATACCG
6961 CATCAGATTGGCTATTGG

FIG. 17D